

**IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF PENNSYLVANIA**

JILL SIKKELEE, Individually and as
Personal Representative of the Estate of
David Sikkelee, Deceased,

Plaintiff,

v.

PRECISION AIRMOTIVE
CORPORATION, *et al.*,

Defendants.

No. 4:07-CV-00886

(Judge Brann)

MEMORANDUM OPINION

FEBRUARY 4, 2021

I. BACKGROUND

In 2007, Jill Sikkelee filed a complaint related to the 2005 death of her husband, David Sikkelee; that complaint was subsequently twice amended, most recently in 2011.¹ In the second amended complaint, Sikkelee alleges that Mr. Sikkelee's private plane crashed after the fasteners holding the plane's MA-4SPA model carburetor's fuel bowl to its throttle body loosened, causing the engine to lose power. She alleges that Lycoming Engines ("Lycoming"), a subsidiary of Avco Corporation, designed, manufactured, and sold the engine that incorporated the allegedly defective carburetor. Sikkelee further alleges that Lycoming was aware of

¹ Doc. 205.

numerous problems and defects with the screws and locking mechanism that attach the carburetor halves together but failed to correct those issues and instead covered them up. Lycoming in turn argues that no mechanical issues contributed to the crash. Rather, it asserts that Mr. Sikkelee tried to climb in altitude too quickly to avoid mountains, which resulted in an aerodynamic stall that caused the plane to lose lift and crash.

In 1969, Lycoming manufactured the engine installed on David Sikkelee's aircraft at the time of the accident. The engine underwent an overhaul in 2004, during which an overhauled model MA-4SPA carburetor was installed on the airplane. The carburetor was designed and manufactured by Marvel-Schebler and was overhauled by Kelly Aerospace. Kelly Aerospace holds a Federal Aviation Administration (FAA) Parts Manufacturer Approval (PMA) certificate² and an FAA repair station certificate authorizing it to manufacture replacement parts and repair and overhaul carburetors independently of the engine manufacturer. During the 2004 carburetor overhaul, Kelly Aerospace replaced a number of parts, including the fuel bowl screws, lock tab washers, and fuel bowl gasket. The carburetor also included a replacement throttle body and fuel bowl of unknown age, origin, and condition.³

² An FAA PMA certification is a combined design and production approval for modification and replacement articles. The design approval phase of the PMA process certifies that a replacement or modification article complies with the airworthiness standards of eligible products (aircraft, engine, or propeller). The applicant shows this compliance through tests and computations unless the article is identical to the article design on a type-certificated product.

³ Doc. 617 at 8-9.

In 2014, this Court granted Lycoming partial summary judgment on the ground that the FAA’s issuance of a type certificate for the engine meant that the federal standard of care had been satisfied and Lycoming was not negligent or strictly liable.⁴ The Court denied summary judgment on Sikkelee’s failure-to-warn claims, which were based on Lycoming’s alleged violation of 14 C.F.R. § 21.3 based on its failure to “report any failure, malfunction, or defect in any product, part, process, or article” that Lycoming made.⁵

On appeal, the United States Court of Appeals for the Third Circuit held that “field preemption does not apply to state-law aircraft products liability claims because (1) ‘the Federal Aviation Act, the General Aviation Revitalization Act of 1994, and the regulations promulgated by the [FAA] reflect that Congress did not intend to preempt aircraft products liability claims in a categorical way,’; (2) ‘Congress has not created a federal standard of care for persons injured by defective airplanes,’; and (3) ‘the type certification process cannot as a categorical matter displace the need for compliance in this context with state standards of care.’”⁶ The Third Circuit thus held that “aircraft products liability cases like Sikkelee’s may proceed using a state standard of care, subject to traditional principles of conflict

⁴ Doc. 495.

⁵ *Id.*

⁶ *Sikkelee v. Precision Airmotive Corp.*, 907 F.3d 701, 708 (3d Cir. 2018) (quoting *Sikkelee v. Precision Airmotive Corp.*, 822 F.3d 680, 683, 696 (3d Cir. 2016)).

preemption, including in connection with the specifications expressly set forth in a given type certificate.”⁷

On remand, Lycoming again moved for summary judgment, asserting that Sikkelee’s claims were subject to conflict preemption and would, in any event, fail under Pennsylvania law.⁸ This Court again granted summary judgment in Lycoming’s favor, concluding that Sikkelee’s claims were conflict-preempted and, even if they were not, Lycoming was entitled to summary judgment on Sikkelee’s strict liability and negligence claims based on Pennsylvania law.⁹ Sikkelee again appealed, and the Third Circuit again reversed in part, holding that this “Court erred in concluding Sikkelee’s claims are conflict-preempted because Lycoming has not produced clear evidence that the FAA would not have allowed it to change the engine’s design as set forth in the type certificate. The Court also erred in granting Lycoming summary judgment on Sikkelee’s strict liability and negligence claims because there are genuine disputes of material fact concerning, among other things, causation.”¹⁰

After this most recent remand, both parties replaced some of their expert witnesses, Lycoming substituting: Randy Jensen for James Stabley for engine investigations; Leslie Doud for Walter Voisard with respect to propeller

⁷ *Id.* (internal quotation marks omitted).

⁸ Doc. 534.

⁹ Doc. 565.

¹⁰ *Sikkelee*, 907 F.3d at 704-05.

investigation; and Amy Gray for Merritt Birkey regarding chemistry and fire origin. The parties have now filed numerous motions to strike or exclude expert testimony. Sikkelee seeks to strike the opinions of: (1) Randy Jensen, Leslie Doud, and Amy Gray;¹¹ (2) Tom Eager;¹² (3) Dale Alexander;¹³ (4) any propeller analysis and RPM calculation from defense experts Jeffrey Edwards, Leslie Doud, and Randy Jensen;¹⁴ (5) any testimony from Jeffrey Edwards;¹⁵ and (6) any testimony from Michael Dreikorn.¹⁶ Lycoming in turn seeks to strike Michael Schiefer¹⁷ and Donald E. Sommer,¹⁸ and has moved to exclude as untimely the opinions of Donald Sommer and Richard McSwain.¹⁹

On January 19, 2021, the Court held a hearing on the pending motions where it heard testimony from the relevant experts. Having reviewed the briefs, expert reports, and *Daubert* testimony, the Court concludes that the majority of arguments concerning the expert opinions go to weight rather than admissibility and, accordingly, the *Daubert* motions will largely be denied. Moreover, upon consideration of the relevant factors concerning the admissibility of expert opinions

¹¹ Doc. 606.

¹² Doc. 608.

¹³ Doc. 610. In her motion, Sikkelee originally sought to strike portions of both Dale Alexander and Gary Novak. However, during the *Daubert* hearing, Sikkelee clarified that she has no objection to Novak's opinion, and seeks to strike only Alexander's opinion.

¹⁴ Doc. 612.

¹⁵ Doc. 614.

¹⁶ Doc. 648.

¹⁷ Doc. 616.

¹⁸ Doc. 618.

¹⁹ Doc. 627.

that were in some ways procedurally improper, the parties' motions to strike will be denied.

II. DISCUSSION

Federal Rules of Evidence 702 and 703 govern the admissibility of expert testimony and set forth certain criteria for admissibility. Expanding upon those Rules, the United States Supreme Court set forth the standard for admissibility of expert testimony in *Daubert v. Merrell Dow Pharm., Inc.*²⁰ The Court in *Daubert* delegated to district courts a “gatekeeping responsibility” under Rule 702, which requires that courts determine at the outset whether an expert witness may “testify to (1) scientific knowledge that (2) will assist the trier of fact.”²¹ That gate-keeping function demands an assessment of “whether the reasoning or methodology underlying the testimony is scientifically valid” as well as “whether that reasoning or methodology properly can be applied to the facts in issue.”²² A district court “exercises more control over experts than over lay witnesses,” since “[e]xpert evidence can be both powerful and quite misleading because of the difficulty in evaluating it.”²³

Following *Daubert*, the United States Court of Appeals for the Third Circuit cast expert admissibility determinations in light of three basic requirements:

²⁰ 509 U.S. 579 (1993).

²¹ *Id.* at 592.

²² *Id.* at 592-93.

²³ *Id.* at 595 (internal quotation marks omitted).

(1) qualification; (2) reliability; and (3) fit.²⁴ The qualification prong demands that the proffered expert possess sufficient “specialized knowledge” to testify as an expert.²⁵ To satisfy the reliability prong, an expert’s opinion “must be based on the ‘methods and procedures of science’ rather than on ‘subjective belief or unsupported speculation.’”²⁶ The Third Circuit has set forth eight non-exclusive factors that “a district court should take into account” when deciding the reliability of expert testimony:

(1) whether a method consists of a testable hypothesis; (2) whether the method has been subject to peer review; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling the technique’s operation; (5) whether the method is generally accepted; (6) the relationship of the technique to methods which have been established to be reliable; (7) the qualifications of the expert witness testifying based on the methodology; and (8) the non-judicial uses to which the method has been put.²⁷

With regard to the fit prong, the Third Circuit explained that admissibility “depends . . . on the proffered connection between the scientific research or test result . . . and [the] particular disputed factual issues.”²⁸

The burden of proof for admissibility of expert testimony falls upon the party that seeks to introduce the evidence.²⁹ However, as the Third Circuit has emphasized, “[t]he test of admissibility is not whether a particular scientific opinion

²⁴ *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 741-43 (3d Cir. 1994).

²⁵ *Id.* at 741.

²⁶ *Id.* at 742 (quoting *Daubert*, 509 U.S. at 589).

²⁷ *Id.* at 742 n.8.

²⁸ *Id.* at 743 (internal quotation marks omitted).

²⁹ *Oddi v. Ford Motor Co.*, 234 F.3d 136, 145 (3d Cir. 2000).

has the best foundation or whether it is demonstrably correct. Rather, the test is whether the particular opinion is based on valid reasoning and reliable methodology.”³⁰

This standard is not intended to be a high one, nor is it to be applied in a manner that requires the plaintiffs to prove their case twice—they do not have to demonstrate to the judge by a preponderance of the evidence that the assessments of their experts are correct, they only have to demonstrate by a preponderance of evidence that their opinions are reliable.³¹

District courts must always be cognizant of the fact that “[t]he analysis of the conclusions themselves is for the trier of fact when the expert is subjected to cross-examination.”³²

A. Motions to Strike on Procedural Grounds

The parties have collectively filed three motions to strike various opinions on procedural grounds. First, Sikkelee seeks to strike portions of Jensen, Doud, and Gray’s opinions, as Sikkelee argues that portions of those opinions improperly exceed the scope of the original expert reports.³³ Second, Sikkelee argues that Michael Dreikorn’s opinion should be stricken as untimely.³⁴ Finally, Lycoming seeks to exclude as untimely the opinions of Donald Sommer and Richard McSwain.³⁵

³⁰ *Id.* (internal quotation marks omitted).

³¹ *Id.* (internal quotation marks omitted).

³² *Id.* (internal quotation marks omitted).

³³ Doc. 607.

³⁴ Doc. 649.

³⁵ Docs. 627, 628.

With respect to the question of whether untimely or otherwise procedurally defective opinions should be admitted, although the Court has discretion to exclude evidence in response to violations of pretrial disclosure deadlines, “exclusion of critical evidence is an ‘extreme’ sanction, and thus, a district court’s discretion is not unlimited.”³⁶ Accordingly, in determining whether exclusion of evidence is warranted, the Court should consider the five *Pennypack*³⁷ factors:

(1) “the prejudice or surprise in fact of the party against whom the excluded witnesses would have testified” or the excluded evidence would have been offered; (2) “the ability of that party to cure the prejudice”; (3) the extent to which allowing such witnesses or evidence would “disrupt the orderly and efficient trial of the case or of other cases in the court”; (4) any “bad faith or willfulness in failing to comply with the court’s order”; and (5) the importance of the excluded evidence. The importance of the evidence is often the most significant factor.³⁸

i. Motion to Strike Randy Jensen, Leslie Doud, and Amy Gray

First, with respect to Sikkelee’s motion to strike Randy Jensen, Leslie Doud, and Amy Gray, Sikkelee contends that all three experts offer opinions that improperly exceed the scope of the original expert reports.³⁹ As to Jensen, Sikkelee argues that Lycoming’s original expert (James Stabley) did not examine or test the carburetor in any way or offer an opinion as to “whether the carburetor

³⁶ *ZF Meritor, LLC v. Eaton Corp.*, 696 F.3d 254, 297 (3d Cir. 2012).

³⁷ *Meyers v. Pennypack Woods Home Ownership Ass’n*, 559 F.2d 894 (3d Cir. 1977).

³⁸ *ZF Meritor*, 696 F.3d at 298 (quoting *Pennypack*, 559 F.2d at 904-05).

³⁹ Doc. 607.

malfunctioned . . . [or] address the effect of loose carburetor throttle body to bowl screws on the engine's operation.”⁴⁰

With respect to Doud, Sikkelee asserts that the original expert (Walter Voisard) opinion addressed only damage to the plane's propeller to determine the amount of power that was being provided to the propeller at the time of the crash, whereas Doud examined other pieces of the propeller, calculated the airspeed of the plane, examined propeller strike marks on the ground to determine speed and power at the moment of impact, and compared those strike marks with strike marks in other accidents.⁴¹ Finally, with respect to Gray, Sikkelee asserts that the original expert (Merritt Birky) opined that aviation fuel was found on the outside of the carburetor after the crash, whereas Gray opines that there “was no ‘abundance of fuel near the carburetor's exterior.’”⁴²

Sikkelee argues that all three new expert opinions impermissibly exceed the scope of the original expert opinions proffered by Lycoming, and they must therefore be stricken.⁴³ Lycoming responds that the new expert opinions encompass the same subject matter as the original reports and are narrowly tailored to rebut

⁴⁰ *Id.* at 3; *see id.* at 3-6. Although there was originally a dispute with respect to Jensen's analysis of screw thread damage, at the *Daubert* hearing Lycoming withdrew that portion of Jensen's opinion, which may render moot that portion of Sikkelee's motion to exclude. Regardless, the Court's analysis under the *Pennypack* factors applies with equal force to this opinion.

⁴¹ *Id.* at 6-9.

⁴² *Id.* at 9.

⁴³ *Id.* at 9-15.

Sikkelee's expert and, in any event, exclusion is not warranted because Sikkelee is not prejudiced by the reports, and the reports are critical to the defense.⁴⁴

Essentially, Lycoming concedes that the new expert opinions vary from the original opinions, but contends that such variation is normal and appropriate, as:

Lycoming could not require its substitute experts to reach specific conclusions or apply particular methodology within their areas of expertise. It is up to the experts, based on their training, qualifications, and experience, to formulate opinions based on the record evidence and their chosen methodology. Lycoming appropriately retained substitute experts within the same areas of expertise as the prior experts . . .⁴⁵

a. Whether the Opinions are New

The law is clear that “[t]he purpose of allowing substitution of an expert is to put the movant in the same position it would have been in but for the need to change experts; it is not an opportunity to designate a ‘better’ expert who holds differing or more advantageous opinions than the first expert.”⁴⁶ Thus, “in instances of expert witness substitution[, courts will generally seek] to prevent prejudice by” ensuring that the testimony is “substantively similar to the original expert’s opinions and limited to the same matters.”⁴⁷ Stated differently, substitute expert testimony should

⁴⁴ Doc. 620.

⁴⁵ *Id.* at 8.

⁴⁶ *Shipp v. Arnold*, No. 4:18-CV-4017, 2019 WL 4040597, at *2 (W.D. Ark. Aug. 27, 2019).

⁴⁷ *Lefta Assocs., Inc. v. Hurley*, No. 1:09-CV-2487, 2013 WL 12239510, at *2 (M.D. Pa. Feb. 13, 2013).

be limited “to the subject matter and theories already espoused by the former expert.”⁴⁸

Despite these limitations, as other courts have emphasized, “the substitute expert is not compelled to merely repeat the words of his or her predecessor. He or she may use different language and even reach ‘slightly broader conclusions’ so long as the new report is ‘substantially similar in all material respects’ to the previous report.”⁴⁹ This is true because, while a substitute expert “should not result in a windfall for [the party offering the substitute expert], neither should it unfairly disadvantage them.”⁵⁰ Accordingly, “the substitute expert ‘should have the opportunity to express his opinions in his own language after reviewing the evidence and performing whatever tests prior experts on both sides were allowed to perform,’”

⁴⁸ *Shipp*, 2019 WL 4040597, at *2 (quoting *Lincoln Nat’l Life Ins. Co. v. Transamerica Fin. Life Ins. Co.*, No. 1:04-CV-396, 2010 WL 3892860, at *2 (N.D. Ind. Sept. 30, 2010)). See also *Rouviere v. Depuy Orthopaedics, Inc.*, No. 1:18-CV-04814, 2020 WL 6939646, at *3 (S.D.N.Y. Nov. 24, 2020) (noting that “permitting Plaintiffs to expand the scope of their expert report to include [new] opinions . . . would constitute improper scope creep for a substitute expert”); *McDonald v. Wexford Health Sources, Inc.*, No. 09-CV-4196, 2016 WL 1383191, at *7 (N.D. Ill. Apr. 7, 2016) (concluding that “courts confronted with an expert who dies before trial have allowed a substitute expert to issue a new report that falls within the scope of the original expert’s report, addresses the same subject matter, and utilizes the same theories of liability in damages or expresses the original expert’s opinions in their own language provided they address the same subject matter without meaningful change”); *Baumann v. Am. Family Mut. Ins. Co.*, 278 F.R.D. 614, 616 (D. Colo. 2012) (holding that substitute “opinion should not stray from the subject matter of [the original] opinion. To the extent that [replacement expert] covers new material in his deposition, Defendant may file a motion to exclude that portion of [the] opinion”).

⁴⁹ *Shipp*, 2019 WL 4040597, at *2 (quoting *Potoski v. Wilkes Univ.*, No. 3:06-CV-2057, 2010 WL 3811973, at *8 (M.D. Pa. Sept. 22, 2010)).

⁵⁰ *Lefta Assocs.*, 2013 WL 12239510, at *4.

as long as the new opinion is “substantively similar and” not “contrary to or inconsistent with” the original opinion.⁵¹

Here, the substitute expert opinions in some instances go beyond the original expert reports. For example, as to Doud’s opinion, the original expert noted only a single propeller blade strike on the ground at the crash site⁵² and determined that the plane’s engine was operating at a high RPM based upon damage to its propeller.⁵³ In contrast, Doud examined ground damage and determined that there were two propeller blade strikes; based on those strikes, he was able to perform a mathematical calculation to determine the engine RPM at the moment of impact.⁵⁴ That calculation was notably absent from the original expert’s report and materially alter the basis for the conclusion that the engine was operating at a high RPM at the moment the plane crashed.

In contrast, analysis of other plane crashes that generated similar propeller damage to this crash falls within “the subject matter and theories already espoused by the former expert.”⁵⁵ The prior expert opined that the damage to the propeller here could be examined to determine the RPM at the time of impact—most notably

⁵¹ *Shipp*, 2019 WL 4040597, at *3 (quoting *Lincoln Nat’l Life Ins.*, 2010 WL 3892860, at *2; *Morel v. Daimler-Chrysler Corp.*, 259 F.R.D. 17, 222 (D.P.R. 2009); *U.S. ex rel. Agate Steel, Inc. v. Jaynes Corp.*, No. 2:13-CV-01907, 2015 WL 1546717, at *2 (D. Nev. Apr. 6, 2015)).

⁵² Doc. 607-3 at 4. It is not clear that the expert was stating that there was definitively only one strike mark. Indeed, another of Lycoming’s experts opined in 2010 that photographs of the crash site showed two propeller blade strikes on the ground. Doc. 607-1 at 7.

⁵³ Doc. 607-3 at 4-7.

⁵⁴ Doc. 607-4 at 20-29.

⁵⁵ *Shipp*, 2019 WL 4040597, at *2.

through damage such as chordwise/rotational scoring damage to the propeller blades and the blade fracturing and bending, along with nicks and gouges on the blade.⁵⁶ Doud too opines that such damage indicates that the airplane's engine was operating at high RPM,⁵⁷ and his analysis of the other plane crashes appears aimed only at providing additional evidence that his theory and opinion is correct.⁵⁸ Thus, it is apparent that Doud is not expanding the prior expert's theory or opinion, but merely supplementing it with additional evidence, which is permissible.

With respect to Jensen, his expert report is in many ways similar to that of the original expert report. The original expert did not view the carburetor, but did examine pictures of the damaged carburetor and concluded that any damage to the carburetor was likely the result of extreme heat resulting from the post-crash fire.⁵⁹ He further opined that any loose screws and nuts in the carburetor were, again, likely the result of the post-crash fire, which burned away the carburetor gaskets and caused expansion and contraction of the carburetor metal.⁶⁰ Jensen also opined that damage to the carburetor was likely from a post-crash fire, which caused any loose screws.⁶¹ To further buttress this theory, Jensen examined pictures of the carburetor post-crash and opined that those pictures demonstrated that the carburetor's lock tab

⁵⁶ Doc. 607-3.

⁵⁷ Doc. 607-4 at 30-33.

⁵⁸ *Id.* at 33-40.

⁵⁹ Doc. 607-1 at 6, 9-11.

⁶⁰ *Id.* at 11.

⁶¹ Doc. 607-2 at 9-11.

washer “pants legs” were “in a clockwise (tight) position,” meaning that the screws could not have become loose prior to the crash.⁶² Although these analyses were not included in the original expert report, the Court concludes that Jensen did not expand the prior expert’s theory or opinion, but again merely supplemented it with additional evidence.

However, Jensen conducted engine testing to analyze the impact of loose carburetor screws on an airplane engine’s performance.⁶³ Specifically, Jensen obtained a Cessna 172 aircraft—the same type involved in the crash—and loosened the carburetor screws to different degrees to analyze whether the engine could still start and operate.⁶⁴ As a result of this testing, Jensen determined that loose screws impacted the engine’s ability to start and operate at idle and low speeds, but did not impact its operation at high power.⁶⁵ This testing is markedly different from any testing performed by the previous expert, and constitutes a new opinion that exceeds the scope of the original opinion.

With respect to Gray’s opinion, there do not appear to be any inconsistencies between the original opinion and Gray’s replacement opinion. While Sikkelee contends that Birky opined that there was aviation fuel on the outside of the carburetor,⁶⁶ Birky’s report actually notes that it is not possible to determine whether

⁶² *Id.*

⁶³ *Id.* at 13-14.

⁶⁴ *Id.*

⁶⁵ *Id.*

⁶⁶ Doc. 607 at 9.

the lead deposits on the outside of the carburetor were the result of aviation fuel or from lead soldering that melted in the fire.⁶⁷ Gray’s opinion is not inconsistent with this conclusion, as she simply opines that there was no “abundance of available fuel on the outer surfaces of the carburetor such as would be expected if the carburetor screws were loose during flight.”⁶⁸ Sikkelee’s arguments with respect to Gray’s opinion are thus without merit.

b. Whether Untimely Opinions Should be Admitted

Sikkelee argues that exclusion of any improper opinion is warranted because of the significant prejudice that she will face should those opinions be admitted. Sikkelee contends that she will need to have her experts prepare rebuttals—which will take up to six months and perhaps in excess of \$100,00 to complete—which is not feasible given that trial is set to begin in early March 2021.⁶⁹ Sikkelee also argues that Lycoming has acted in bad faith, as it “had to know and yet failed to disclose that it was recalibrating its defense and substantially altering its theories of the case. Defendant concealed this information from the Court and from the Plaintiff in the six months between when permission to substitute experts was granted in early March and when the substituted experts’ disclosures were made on September 11, 2020.”⁷⁰

⁶⁷ Doc. 607-6 at 7-8.

⁶⁸ Doc. 607-7 at 24.

⁶⁹ Doc. 607 at 11-14.

⁷⁰ *Id.* at 15.

Lycoming responds that no additional testing or analysis is required to respond to the new expert opinions, since: (1) the testing done by Jenson was simply an attempt to replicate the test upon which Sikkelee's expert relied and, if that test were reliable, there would be no need to repeat it; (2) Sikkelee's expert does not believe in the validity of Doud's data that he used to calculate engine power and, accordingly, there would be no apparent need to recreate that data; and (3) with respect to Doud's analysis of the propeller parts, Sikkelee's expert decided that no analysis of these parts was necessary as their condition was not indicative of the power of the engine at the time of the crash.⁷¹ To the extent that there may be any prejudice, Lycoming proposes allowing Sikkelee to depose their new expert witnesses and submit rebuttal expert reports, if necessary.⁷² Lycoming further contends that there will be no disruption of trial, it did not act in bad faith, and the substitute expert opinions are critical to Lycoming's case, since the opinions directly rebut Sikkelee's theories of liability.⁷³

As explained above, there are two genuine differences between the replacement opinions and the original expert opinions. First, Doud's reference to two propeller strike marks and his mathematical calculation to determine engine RPM at the moment of impact were markedly different from anything that the

⁷¹ Doc. 620 at 17-19.

⁷² *Id.* at 20.

⁷³ *Id.* at 20-23.

original expert proffered.⁷⁴ Second, Jensen conducted engine testing to analyze the impact of loose carburetor screws on an airplane engine's performance.⁷⁵ Such testing was not conducted by the original expert, nor did that expert offer an opinion on the impact that loose carburetor screws may have on an airplane engine's performance.⁷⁶ Although this presents a close question, the *Pennypack* factors weigh in favor of admitting both opinions.

With respect to Doud's opinion that there were two propeller marks, under the first *Pennypack* factor, this opinion could not have come as a great surprise to Sikkelee, as two of Lycoming's other experts opined that there were two propeller strike marks on the ground at the crash site, with one expert offering that opinion years prior to Doud.⁷⁷ Given that Lycoming's experts opined that there were two propeller strikes on the ground, it likewise would not have been a significant surprise when Doud used the strike marks to perform an RPM calculation, as the formula that he used is well known to aircraft accident investigators and is published in the book *Aircraft Accident Investigation*, which Sikkelee's own experts often use.⁷⁸

As to the second factor, given that Doud's RPM determination is based on a relatively straightforward mathematical calculation, Sikkelee should have little

⁷⁴ Compare Doc. 607-3 at 4-7 with Doc. 607-4 at 20-29.

⁷⁵ Doc. 607-2 at 13-14.

⁷⁶ See Doc. 607-1.

⁷⁷ Doc. 607-1 at 7; Doc. 607-2 at 8.

⁷⁸ See Doc. 607-4 at 26. Sikkelee likewise relies on this book, indicating that this formula was known to her and her experts. *E.g.* Doc. 613 at 7.

difficulty in curing any prejudice, as she may simply have her experts perform the same mathematical calculation, or review the photograph upon which Doud relied to determine the distance between the propeller strikes to attempt to refute that distance calculation or to refute the notion that there were in fact two propeller strikes.⁷⁹ Third, in light of the lack of difficulty in curing any prejudice, and the fact that Sikkelee would not need to expend significant time or resources countering Doud's opinion, permitting the opinion would not disrupt an orderly and efficient trial in this matter.

With respect to the fourth factor, there does not appear to be any bad faith in Doud's or Lycoming's actions. Lycoming obtained permission to replace its prior expert after that expert died in 2018.⁸⁰ As Lycoming rightly notes, it could not dictate the opinion that Doud would give, or how he would reach his conclusions. These are matters that must be left to the expert, and striking portions of the report that improperly exceed the bounds of the original expert report is the proper remedy, rather than expecting Lycoming to dictate to its experts what conclusions they must reach.

Finally, the evidence proffered is of some importance. The fact that Doud is able to use propeller strike marks to accurately determine engine RPM based upon

⁷⁹ Although Sikkelee argues that she is prejudiced because any damage at the crash site no longer exists and the image is skewed (Doc. 629 at 9), this is not the type of prejudice with which *Pennypack* is concerned; Sikkelee may still make all of these arguments before a jury in an effort to undercut Doud's opinion.

⁸⁰ See Doc. 599.

a well-established and accurate mathematical formula is critical in helping Lycoming establish that the airplane engine was operating at full power at the time of the crash, which would effectively counter Sikkelee's assertion that the engine failed shortly after takeoff, which in turn led to the crash. This evidence would significantly aid a jury in reaching a liability determination. Although Sikkelee argues that the evidence is not critical because Lycoming did not believe it necessary in 2011 when its original experts issued their reports, this argument does not hold water. While Doud conducts a propeller damage analysis similar to the analysis conducted by Lycoming's original expert,⁸¹ Sikkelee and her experts go through great lengths to discredit such an analysis; if Sikkelee believes that a propeller damage analysis is insufficient to demonstrate that the engine was operating at high RPM, it is—at best—disingenuous to argue that other evidence supporting Lycoming's theory is not important.⁸² Consequently, the *Pennypack* factors weigh in favor of admitting Doud's propeller RPM analysis, and Sikkelee's motion will be denied in that respect.

Turning to Jensen's analysis of the impact of loose carburetor screws on airplane engine performance, first, there again does not appear to be significant surprise or prejudice to Sikkelee. The very same tests that Jensen conducted were previously conducted by Sommer, one of Sikkelee's experts.⁸³ It could not have

⁸¹ See Doc. 607-4 at 30-33.

⁸² Doc. 613 at 16-17.

⁸³ See Doc. 619-2.

come as a surprise that Lycoming would seek to recreate Sommer's test, nor is Sikkelee prejudiced by this, given that her expert has already conducted that test and would have all of the information needed to counter Jensen's opinion. Second, given that Sikkelee has already performed all necessary tests, any prejudice could be cured simply by deposing Jensen. In light of the ease with which Sikkelee may alleviate any prejudice, allowing Jensen's opinion would not disrupt trial, regardless of the imminence of trial.

Fourth, for the reasons discussed above with respect to Doud, there does not appear to be any bad faith in Jensen's new testing and opinion. Finally, the new opinion appears to be important to the defense. With respect to Jensen's lock tab washer analysis, this analysis indicates that the carburetor screws were not loose at impact, which directly refutes Sikkelee's claims that loose carburetor screws caused the crash. Similarly, Jensen's tests on engine performance with loosened carburetor screws directly contradicts Sikkelee's theory of the case and undermines her experts, making it important to Lycoming's defense. Accordingly, the *Pennypack* factors also weigh against exclusion of this opinion, and Sikkelee's motion to strike will be denied in its entirety.

ii. Motion to Strike Michael Dreikorn

Sikkelee has also filed a motion to strike the “untimely disclosed expert” opinion of Michael Dreikorn.⁸⁴ Sikkelee argues that this report should be excluded because the report is untimely, there is no justification for the untimely disclosure, and said untimely disclosure is prejudicial to her.⁸⁵ Sikkelee argues that expert reports were due in November 2011, and that Lycoming did not disclose that it would submit any report from a regulatory expert.⁸⁶ Sikkelee served the expert report of Michael Schiefer (a substitute expert) on September 4, 2020 and, on October 2, 2020, Lycoming served Dreikorn’s report, which it argues is a rebuttal to Schiefer’s report.⁸⁷

Lycoming responds that the Court’s April 27, 2020 Order did not expressly prohibit Lycoming from filing rebuttal reports to Sikkelee’s substitute experts. Therefore, Lycoming argues, its rebuttal report was timely under Fed. R. Civ. P. 26(a)(2)(D)(ii), as it was served within thirty days of Sikkelee’s substitute report.⁸⁸ Even if the report were deemed untimely, Lycoming asserts that exclusion is unwarranted because there is no prejudice to Sikkelee, and Dreikorn’s opinion is important to Lycoming’s defense.⁸⁹

⁸⁴ Doc. 648.

⁸⁵ Doc. 649.

⁸⁶ *Id.* at 3.

⁸⁷ *Id.* at 4.

⁸⁸ Doc. 661 at 4-11.

⁸⁹ *Id.* at 11-15.

The Court concludes that Dreikorn's report is a permissible rebuttal opinion, as Schiefer's report presents some new arguments and analysis, and Dreikorn's report appears aimed at countering those new arguments. However, even assuming that the rebuttal report is untimely, the Court concludes that the *Pennypack* factors weigh in favor of admission.

First, there does not appear to be any prejudice to Sikkelee; although Sikkelee asserts that Lycoming's untimely disclosure deprived her of the ability to file a *Daubert* challenge, she waited two months after receiving the Dreikorn report to file this motion when, instead, she could have filed a *Daubert* motion in time to hear any arguments related to the Dreikorn report at the *Daubert* hearing held on January 19, 2021. Moreover, Sikkelee has sufficient time to prepare for cross examination, and Lycoming has offered Dreikorn for deposition.⁹⁰

Admitting Dreikorn's opinion also would not disrupt the order or efficiency of trial. Plaintiff has no right to rebut this rebuttal expert, and there is sufficient time to depose the witness and prepare to cross-examine Dreikorn at trial. Moreover, there does not appear to have been bad faith or willful non-compliance with a court order, as Lycoming filed a rebuttal report to respond to new opinions that were recently offered by Sikkelee's replacement expert. Finally, this testimony is of some importance, as it is the only expert opinion that rebuts Schiefer's opinion, and

⁹⁰ Doc. 661 at 12.

Dreikorn's opinion is therefore necessary to counter Schiefer's opinion. In sum, Dreikorn's opinion is a legitimate rebuttal opinion but, even if it were untimely, the *Pennypack* factors weigh in favor of admitting said opinion, and Sikkelee's motion will be denied.

iii. Motion to Strike Donald Sommer and Richard McSwain

Finally, Lycoming seeks to exclude as untimely the opinions of Sommer and McSwain.⁹¹ Lycoming contends that, in its motion to strike Sommer and McSwain's expert reports, it referenced numerous analytical gaps and issues in said reports and, in response, both experts submitted supplemental reports on October 9, 2020 that contained new opinions in an attempt to shore up the deficiencies that Lycoming had cited.⁹²

For the first time, McSwain opines that an examination of a sectioned portion of one of the fastener holes (identified as fastener hole number one) shows shearing of the first six threads in the bowl fastener hole but no evidence of shearing on the seventh thread. McSwain concludes that the lack of thread engagement on the seventh thread proves that the screw must have been at least six flats loose prior to the crash. He further opines that similar features are present on fastener hole number four and "that 'axial cyclic thread rubbing marks' in the throttle body fastener holes numbers 2 and 3 are evidence that they were more likely than not also out one full

⁹¹ Docs. 627, 628.

⁹² *Id.*

rotation because they also exhibited throttle body fastener hole thread contact markings.”⁹³ Sommer reaches the same opinion in his supplemental report. McSwain further opines that already-loosened carburetor screws can rotate three flats in one second, which would permit the aircraft engine to start, but then fail immediately after takeoff.⁹⁴

Lycoming asserts that, under the *Pennypack* factors, the experts’ belated opinions were a willful violation of the Court’s scheduling Order, as the opinions were offered well after the respective deadlines for expert reports, and only five months prior to trial.⁹⁵ Sikkelee responds that the new opinions were issued to rebut the opinion offered by Lycoming’s replacement expert, Jensen, who opined that there was damage to the carburetor screw threads down to the 6-7 thread, which would indicate that the carburetor screws were fully engaged and further opined that the fact that the engine started is conclusive proof that the carburetor screws were not loose.⁹⁶ Even if the opinions were new, Sikkelee contends that they would be admissible under the *Pennypack* factors.⁹⁷

As to McSwain and Sommer’s screw thread analysis, the admissibility of that portion of the rebuttal opinion is complicated by Lycoming’s decision at the *Daubert* hearing to withdraw Jensen’s screw thread analysis. Lycoming’s decision to

⁹³ Doc. 628-8 at 3; *see id.* at 2-8.

⁹⁴ Doc. 637-2 at 2-3.

⁹⁵ *Id.* at 10-11.

⁹⁶ Doc. 637 at 7-16.

⁹⁷ *Id.* at 20-23.

withdraw Jensen's screw thread analysis means that McSwain and Sommer's screw thread analysis can no longer be deemed a rebuttal opinion, as there is no longer an opinion for them to rebut—at least as to the screw thread damage analysis. This portion is thus an untimely opinion that must be analyzed under *Pennypack*. An examination of those factors reveals that McSwain and Sommer's thread damage analysis should not be excluded.

First, as to the prejudice or surprise, given that Lycoming's own expert first introduced the theory that damage to the carburetor screw threads indicates that the screws were fully engaged at the time of the crash, it should not be surprising that Sikkelee would seek to respond to this assertion. However, there is discernable prejudice in light of Lycoming's decision to withdraw Jensen's screw thread damage analysis. Were Sikkelee permitted to offer McSwain and Sommer's screw thread analysis with Jensen's opinion having been withdrawn, it would leave McSwain and Sommer's screw thread analysis unrebutted and, essentially, un rebuttable. This rather significant prejudice weighs in favor of excluding McSwain's screw thread analysis. Nevertheless, under the second factor, any prejudice could be mitigated by permitting Jensen to offer his opinion at trial, which would permit Lycoming to attempt to counter McSwain's opinion.

With regard to the third *Pennypack* factor, admitting the screw thread analysis would likely not disrupt trial, as Jensen has already prepared an opinion that could rebut McSwain and Sommer's screw thread analysis, and any necessary depositions

could be conducted prior to trial. Fourth, there does not appear to be any bad faith or willfulness in the actions of Sikkelee's experts, given that they responded to a new opinion that was just recently offered by Jensen, even if that opinion has now been withdrawn.

As to the final *Pennypack* factor, any importance that McSwain and Sommer's screw thread analysis once held as a rebuttal opinion evaporated when Lycoming withdrew Jensen's screw thread damage opinion. However, as explained below, this portion of McSwain's opinion is critical in detailing how he and Sommer may opine with any degree of certainty that the carburetor screws were loosened to a sufficient degree that the aircraft's engine could have failed. This *Pennypack* factor therefore weighs heavily in favor of admission, and the relative weight of the *Pennypack* factors militate slightly in favor of permitting McSwain and Sommer's screw thread analysis. As a necessary corollary, however, Lycoming will be permitted to reconsider its withdrawal of Jensen's screw thread analysis, and Jensen will be permitted to offer that opinion at trial.⁹⁸

Similarly, the Court concludes that McSwain and Sommer's opinion that screws may loosen by three flats within one second due to vibration—meaning that an aircraft engine may start but then fail shortly after takeoff—is admissible under the *Pennypack* factors. With respect to surprise or prejudice, there is likely little

⁹⁸ Or, in contrast, Sikkelee will be permitted to withdraw this portion of McSwain and Sommer's rebuttal opinion. Should she choose to withdraw that portion of the rebuttal opinion, Jensen's screw thread analysis will not be permitted at trial.

surprise, as Lycoming itself asserts that it is not possible, based on McSwain's testing, for an engine to start when carburetor screws are loosened six flats, which is the approximate looseness needed before an engine will fail. It is only natural that Sikkelee would seek to counter this assertion.

There is, however, some possibility of prejudice. Lycoming will need to respond to McSwain's testing, which will take some time and effort. Additionally, Lycoming will need to question McSwain about his testing methodology, amongst other things. However, this prejudice may be largely alleviated by requiring Sikkelee to submit McSwain (and, to the extent necessary, Sommer) for a deposition as soon as is practically possible. This would permit Lycoming to have any questions answered and, if the deposition is conducted in the immediate future, would permit Lycoming to conduct its own tests to confirm or refute McSwain's tests. This should permit Lycoming to cure any prejudice that it may experience. As to the third *Pennypack* factor, although trial is rapidly approaching, Lycoming should be able to depose McSwain and conduct its own testing before trial, meaning that orderly and efficient trial will not be disrupted.

Fourth, it is again difficult to discern any bad faith or willfulness in the actions of Sikkelee's experts, as they were largely done in response to Jensen's recently proffered expert report. As to the final and most important *Pennypack* factor, the importance of the evidence, the evidence here is critical to Sikkelee's case.

McSwain's testing—demonstrating that an engine will shut down when carburetor screws are loosened by six flats but, simultaneously, will not start when the screws are loosened four or more flats—gives rise to a natural question that Lycoming's experts have exploited: if loose carburetor screws caused Mr. Sikkelee's aircraft to lose power and crash, how was he able to start the aircraft in the first instance? McSwain's recent testing and opinion demonstrates that it is possible for the engine to start, but then loosen to a sufficient degree during takeoff that the engine would then fail shortly after takeoff. Such evidence is critical for Sikkelee and, absent this evidence, it is difficult to conceive of how a jury could find in her favor at trial. This factor thus strongly weighs in favor of admitting McSwain and Sommer's opinion regarding screw loosening and, after weighing all *Pennypack* factors, the Court concludes that this portion of McSwain and Sommer's rebuttal opinion is therefore admissible.

B. Motions to Strike on Substantive Grounds

Both Sikkelee and Lycoming have also filed motions to exclude certain expert opinions on substantive grounds, arguing that the expert opinions are inadmissible under *Daubert* and its progeny. Sikkelee seeks to exclude portions of the expert opinions proffered by Tom Eagar, Dale Alexander, Leslie Doud, Randy Jensen, and

W. Jeffrey Edwards.⁹⁹ Lycoming in turn seeks to exclude all or portions of Michael Schiefer and Donald E. Sommer's opinions.¹⁰⁰

i. Sikkelee's Motion to Strike Tom Eagar's Opinion

First, Sikkelee seeks to exclude Tom Eagar's opinion.¹⁰¹ Eagar is Lycoming's expert witness who specializes in welding and metallurgy, but who Sikkelee alleges has no expertise in aircraft accident investigation or fire origin methodology.¹⁰² Sikkelee contends that, nevertheless, Eagar's expert report addresses aircraft accident investigation methodology—which is outside of his area of expertise—and offers “unscientific commentary” regarding the relevance of certain documents and the credibility the Sikkelee's experts.¹⁰³

Sikkelee asserts that, despite having no expertise in aviation or aviation accident methodology, Eagar reviews numerous standards and guides on aviation accident methodology and opines that Sikkelee's experts fail to adhere to those standards, and critiques Sikkelee's expert opinion on bases other than metallurgy or welding—he instead bases his critique on examination of logical fallacies that they allegedly committed.¹⁰⁴

⁹⁹ Docs. 608, 610, 612, 614.

¹⁰⁰ Docs. 616, 618.

¹⁰¹ Docs. 608, 609.

¹⁰² Doc. 609 at 1.

¹⁰³ *Id.* at 1-2.

¹⁰⁴ *Id.* at 6-9.

Sikkelee argues that Eagar is not qualified to offer an opinion regarding aviation accident investigation, as he has no specialized training or expertise in that field.¹⁰⁵ She further argues that Eagar's critiques of the methodology of Sikkelee's experts are unreliable, as they are not based on any sound scientific techniques or theories but, rather, are based on his lay interpretation of accident guides and standards.¹⁰⁶ Finally, Sikkelee asserts that Eagar's opinion fails the "fit" prong of the *Daubert* analysis, as his "subjective views about methodology and logic are not founded in objective, reliable, scientific knowledge."¹⁰⁷

Lycoming in turn argues that Eagar "is preeminent in the field of engineering, with expertise in fire science, metallurgy, and materials processing and manufacturing[, and,] [a]s a consultant, he has participated in numerous aircraft accident investigations and has also provided his expertise to assist aerospace manufacturers and related businesses."¹⁰⁸ Eagar used this experience to "inspect[] the subject carburetor and conduct[] temperature testing on an exemplar carburetor to simulate the effects of the post-crash fire" after which he concluded "that the evidence does not support Plaintiff's experts' opinions."¹⁰⁹ Lycoming asserts that Eagar then "applied the scientific method and reliable accident investigation methodologies to identify the logical fallacies and errors that permitted Plaintiff's

¹⁰⁵ *Id.* at 9-11.

¹⁰⁶ *Id.* at 11-14.

¹⁰⁷ *Id.* at 14-15.

¹⁰⁸ Doc. 623 at 4; *see id.* at 5-6, 12-14.

¹⁰⁹ *Id.*

experts to arrive at their erroneous conclusions.”¹¹⁰ Thus, Lycoming argues that Eagar is qualified to offer an expert opinion, and his opinion is reliable.¹¹¹ Lycoming further contends that Eagar’s “identification of the egregious flaws in Plaintiffs’ expert’s methodologies and opinions will assist the trier of fact in evaluating the validity of the Plaintiff’s opinions in this complex products liability case.”¹¹²

Given the liberal qualification standards,¹¹³ the Court concludes that Eagar is sufficiently qualified to offer his expert opinions. Eagar conducted a number of tests on carburetors and metal to determine whether heat or vibration could cause the damage to the screws that was noted by Sikkelee’s experts.¹¹⁴ This is well within Eagar’s area of expertise given that he is, among other things, a professor of materials engineering at the Massachusetts Institute of Technology (MIT) and has degrees in metallurgy from MIT.¹¹⁵

Although Sikkelee contends that Eagar is unqualified to offer an opinion on aircraft accident investigation or offer critiques of Sikkelee’s expert opinions in that area,¹¹⁶ the Court finds that Eagar is likewise qualified to offer an expert opinion in those areas. At the *Daubert* hearing Eagar explained that he has investigated over

¹¹⁰ *Id.*; *see id.* at 14-19.

¹¹¹ *Id.* at 12-19.

¹¹² *Id.* at 4-5.

¹¹³ *See Betterbox Commc’ns Ltd. v. BB Techs., Inc.*, 300 F.3d 325, 328 (3d Cir. 2002) (noting that the Third Circuit “interpret[s] the specialized knowledge requirement liberally” (internal quotation marks omitted)).

¹¹⁴ Doc. 607-1.

¹¹⁵ Doc. 607-2.

¹¹⁶ Doc. 609 9-11.

fifty aviation accidents—including more than one dozen failure analysis investigations for Cape Air—and frequently offers opinions regarding the causes of crashes.¹¹⁷ Eagar further testified that he learned accident investigation techniques and methodologies through decades of on-the-job experience where he frequently relied on treatises and other authoritative documents to perform his job.

Although it is true, as Sikkelee notes, that Eagar does not appear to have any formal education or training in the area of aircraft accident investigations, the Third Circuit has repeatedly affirmed that the “basis of [an expert’s] specialized knowledge can be practical experience as well as academic training and credentials.”¹¹⁸ This training must provide an expert with “skill or knowledge greater than the average layman.”¹¹⁹ Eagar’s decades of experience in aircraft accident investigations and frequent reliance on authoritative texts in that field of work are more than sufficient to qualify him as an expert in that area.¹²⁰

¹¹⁷ See also Doc. 623-1 at 4.

¹¹⁸ *Betterbox*, 300 F.3d at 327.

¹¹⁹ *Id.* at 328.

¹²⁰ *Cf. United States v. Burton*, 404 F. App’x 617, 623 (3d Cir. 2010) (noting that two decades of experience as a narcotics officer qualified an individual “to testify as an expert on narcotics”); *United States v. Nelson*, 372 F. App’x 289, 293 (3d Cir. 2010) (holding that agent was qualified to offer opinion as he “was a DEA agent with over 15 years experience . . . [and] was trained for 14 weeks at Quantico and had been involved in hundreds of drug operations, . . . approximately 10%-20% of [which] involved cooking crack cocaine in a microwave”); *Krys v. Aaron*, 112 F. Supp. 3d 181, 204-05 (D.N.J. 2015) (expert qualified to offer opinion because, although he “lacks any formal academic training in an area relevant to the securities area, he does have *decades* of experience advising and consulting on ‘capital market issues concerning trading, risk management, operations, and technology’ across ‘global capital markets businesses’” and authored various articles on the subject).

Sikkelee next asserts that Eagar's opinion is unreliable, as he is unqualified to offer an opinion as to aircraft accident investigations, and his assertions regarding the flaws in Sikkelee's expert's opinions are incapable of testing.¹²¹ The Court disagrees. As detailed above, Eagar examined the damaged carburetor and conducted tests to determine whether the damage observed is consistent with Sikkelee's theory that the carburetor screws were loose before the crash.¹²² Eagar then examined Sikkelee's experts' reports to determine whether those experts made logical mistakes in reaching their conclusions. Eagar has developed his skills in analyzing logical fallacies through more than 25 years of experience teaching at MIT, and both cited to, and relied upon, scientific literature that discusses logical fallacies in rendering his opinions.¹²³ Thus, not only is Eagar qualified to discuss logical fallacies, but his opinions and methodology are easily reviewable and testable such that Sikkelee may attempt to rebut his opinions.

Finally, although Eagar undoubtedly does not have expertise within all of the subject areas where he opines that Sikkelee's experts committed logical fallacies, that is not relevant to the question of whether his opinions are reliable. Eagar offered opinions on the logical fallacies that Sikkelee's experts allegedly committed—to offer such an opinion, Eagar does not need to specialize in those areas, but merely needs specialization in the field of logical fallacies. The application of logic and

¹²¹ Doc. 609 at 11-14.

¹²² Doc. 609-1.

¹²³ *Id.* at 5-6, 9.

examination of logical fallacies does not necessarily depend on a deep understanding of the underlying subject matter, as one may examine whether a conclusion is logical without examining whether a conclusion is correct.¹²⁴

This is precisely what Eagar did here. For example, on page three of his report, Eagar opined that Sikkelee's experts failed to consider and rule out causes for the crash other than carburetor failure.¹²⁵ Eagar notes that, under the scientific method, an expert must eliminate other potential causes of a crash before reaching a definitive conclusion as to the cause of the crash.¹²⁶ Rather, Eagar contends, Sikkelee's expert engaged in a highly flawed reverse scientific process, whereby they drew a conclusion first, then discarded all evidence to the contrary.¹²⁷ Eagar similarly concludes that, if Sikkelee's experts considered other potential explanations but simply did not discuss them in their reports, they committed a bifurcation fallacy.¹²⁸ Eagar also alleges that Sikkelee's expert makes numerous "unsupported, conclusory statements" that damage the integrity of that expert report.¹²⁹ Although Eagar may not have the expertise to criticize the correctness of some of Sommer's conclusions, he is qualified to criticize analytical and logical gaps in Sommer's opinion.

¹²⁴ For example, it is logically incorrect to say that "if some A's are B's, and some B's are C's, then some A's must be C's." That does not mean, however, that the statement is factually wrong, as it is possible that some A's are in fact C's (and also possible that no A's are C's). One does not need any understanding of A's, B's, or C's to critique the logic of the statement.

¹²⁵ *Id.* at 4-6.

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.* at 4-5.

¹²⁹ *Id.* at 10.

Because logical fallacies and the scientific method are well-accepted and understood by experts, Eagar may rely upon those techniques in his opinion. Moreover, because Eagar has “good grounds for his . . . belief” that Sommer committed logical fallacies and failed to follow the scientific method, his opinion is sufficiently reliable.¹³⁰ Whether Eagar is ultimately correct, or whether his opinions are entitled to any substantial weight, is a matter for a jury to decide.

Finally, Sikkelee argues that Eagar’s opinions do not fit this case, as they are not relevant to what caused the plane crash, and “do not establish that the Plaintiff’s experts failed to follow appropriate aviation accident investigation methodology.”¹³¹ The Court concludes that Eagar’s opinions do fit the case. There is certainly some connection between the existence of logical fallacies and the failure to follow proper scientific method and the weight that should be afforded to an expert opinion. Eagar’s critiques of Sommer’s opinion would be helpful to a jury in assigning weight to Sommer’s opinion, and is therefore admissible.

ii. Sikkelee’s Motion to Strike Dale Alexander’s Opinion

Turning next to Sikkelee’s motion to exclude expert testimony from Dale Alexander, Sikkelee contends that Alexander is not sufficiently qualified to offer certain opinions, as he was retained to perform metallurgical, materials failure, and aircraft accident investigation evaluations despite the fact that, as a nuclear engineer,

¹³⁰ *Elcock v. Kmart Corp.*, 233 F.3d 734, 745 (3d Cir. 2000) (internal quotation marks omitted).

¹³¹ Doc. 609 at 15; *see id.* at 14-15.

he has no specialized knowledge in these areas nor any specialized training or experience in aircraft accidents or metallurgy.¹³² Sikkelee further argues that Alexander's opinion "that the metallurgical features of the screw threads in the subject carburetor were caused by thermal expansion and cooling and not metallic transfer from vibration" is wholly speculative, as Alexander simply assumes that, because heating may cause expansion and cooling may cause contraction, this is what actually happened to the carburetor screws.¹³³

Lycoming responds that Alexander is well-qualified in the areas of materials science and metallurgical failure analysis, with more than 30 years of experience in research and failure analysis with expertise focused in the field of materials science and metallurgy.¹³⁴ He has also led more than 100 projects that involved aviation and has been invited to speak at the General Aviation Air Safety Investigators workshop, among other qualifications and honors.¹³⁵

Lycoming also contends that Alexander reliably applied his expertise to this case.¹³⁶ For example, Alexander applied his expertise in materials failure analysis and metallurgy to analyze the effects of the post-crash fire on the carburetor."¹³⁷ In two other sections, Alexander "examined and tested exemplar carburetors and

¹³² Doc. 611 at 3-7, 10-13.

¹³³ *Id.* at 13-15.

¹³⁴ Doc. 624 at 7-9, 14-18.

¹³⁵ *Id.*

¹³⁶ *Id.* at 20-22.

¹³⁷ *Id.* at 20.

applied his engineering experience and tribological knowledge to confirm that during the installation of a fastener and washer, there is rotational wearing contact under load that can transfer a microscopic amount of the washer plating.”¹³⁸

Alexander also reviewed the positions of the lock tab washers in post-accident photographs and observed that they were in their full clockwise ‘tight’ position” and then “tested an exemplar carburetor by assembling it with the proper installation torque and then performed a same perspective comparison view with the subject carburetor.”¹³⁹ In yet another opinion, “Alexander employed his expertise in metallurgy and materials science to identify multiple sources of the lead detected on the exterior of the subject carburetor,” while “Alexander visually examined the subject carburetor and used SEM/EDS analysis to sample materials from an exemplar carburetor . . . [and] confirmed the lead plug in the carburetor bowl melted away during the post-crash fire and accounts for the presence of lead on the exterior of the subject carburetor.”¹⁴⁰

The Court concludes that Alexander is qualified to offer opinions in materials science and metallurgical failure analysis. Alexander has directed the Materials Practice division of Engineering Systems Inc. since 2009 and, in that capacity, has managed numerous materials engineering personnel and materials analysis

¹³⁸ *Id.*

¹³⁹ *Id.* at 20-21.

¹⁴⁰ *Id.* at 21.

laboratory facilities.¹⁴¹ He has also worked as the lead investigator in more than 300 projects—over 100 of which were aviation-related—where he used a number of accepted methods and techniques to conduct materials failure analyses.¹⁴² Finally, although Alexander’s training and education focused primarily on nuclear engineering, he concentrated his studies on the impact of radiation on materials and, as Alexander explained at the *Daubert* hearing, to understand how radiation impacts materials, one must have a deep understanding of the materials themselves. This education and experience is sufficient to qualify Alexander as an expert in the fields of materials science and metallurgical failure analysis.

Lastly, Sikkelee argues that Alexander’s opinion is unreliable insofar as he opines that thermal heating and cooling caused the damage to the carburetor screw threads—without performing testing, referring to any authoritative texts, or examining heat-damaged carburetors to support his conclusion.¹⁴³ However, the Court finds that the opinion is sufficiently supported and any questions as to the accuracy of the opinion—or whether it would have been best for Alexander to conduct certain tests—goes to weight, rather than admissibility.

Alexander (and Novak) examined the carburetor and determined that the carburetor’s gasket had been burned off during the post-crash fire.¹⁴⁴ Based on

¹⁴¹ Doc. 624-1 at 3.

¹⁴² *Id.* at 3-4.

¹⁴³ Doc. 611 at 14-15.

¹⁴⁴ Doc. 624-1 at 9; Doc. 624-3 at 14.

“[b]asic engineering principles,” Alexander determined that the loss of the gasket resulted in the looseness between the carburetor bowl and throttle body that was observed post-crash.¹⁴⁵ Alexander also opined that accident site photographs depicted the aircraft engine resting on the carburetor, which allowed the steel fastener threads to imprint onto the bores of the through holes of the throttle body aluminum, which was softened by the post-crash fire.¹⁴⁶ This opinion is supported by literature confirming the melting and softening temperatures of steel and aluminum, and the melting of other materials in the engine.¹⁴⁷

Alexander also conducted cross-sectional metallography and determined that there was “inter-dendritic separation of the carburetor bowl Aluminum alloy threads.”¹⁴⁸ He compared the damage to the carburetor with an exemplar carburetor that had been subjected to vibration; a microscopic examination of the exemplar carburetor revealed “that the subject carburetor throttle body through hole marks are different and distinct from vibration induced marks and therefore were not caused by pre-accident carburetor joint looseness.”¹⁴⁹ This testing and analysis is sufficient to render Alexander’s opinion reliable. While Alexander may (or may not) be wrong in his conclusions, his opinion is sufficiently supported by the facts and evidence

¹⁴⁵ *Id.*

¹⁴⁶ Doc. 624-1 at 10-11; Doc. 624-3 at 14.

¹⁴⁷ *Id.*

¹⁴⁸ Doc. 624-1 at 10-11.

¹⁴⁹ *Id.* at 12.

that it should be presented to a jury. Sikkelee's motion to strike Alexander's opinion will therefore be denied.¹⁵⁰

iii. Sikkelee's Motion to Strike Propeller Analysis and RPM Calculation from W. Jeffrey Edwards, Leslie Doud, and Randy Jensen

Next, Sikkelee argues that Edwards, Doud, and Jensen's propeller analysis and calculation of the engine propeller's revolutions per minute (RPM) should be excluded for three reasons.¹⁵¹ First, she contends that a simple visual inspection of the propeller blades cannot be used to determine the engine's power output when the airplane crashed, and the analysis used by the experts contradicts the circumstances and methodology needed to reach such an opinion. Specifically, some literature that addresses the calculation of RPM based upon propeller damage after a crash cautions that such analysis is only reliable if the impact angle was less than 5 degree; blades that are bent in their midsection do not indicate high or low RPM; and, if only one blade is bent, the bend was caused by something other than propeller rotation. According to Sikkelee, the experts nevertheless concluded here that, despite an

¹⁵⁰ Sikkelee initially argued that Alexander and Novak's opinions were not sufficiently delineated in their report and, accordingly, they must submit separate reports that outline their individual contributions to the report. (Doc. 630 at 2-3). Counsel clarified at the *Daubert* hearing that subsequent disclosures from Lycoming adequately delineated which expert contributed to which portions of their report. The Court therefore denies as moot Sikkelee's request that Alexander and Novak submit separate reports.

¹⁵¹ Doc. 613.

impact angle of greater than 20 degrees, the engine was operating at a high RPM because one propeller was bent in its midsection.¹⁵²

Second, Sikkelee contends that the experts conclude that a National Safety Transportation Board (NTSB) photograph of the crash site depicts two propeller strike marks on the ground, but that is contradicted by multiple investigators who concluded that there was only one strike mark on the ground. These investigators, who came from the NTSB, the Cessna Aircraft Company, and Lycoming, all appeared at the crash site and confirmed that there was only one propeller strike mark, as did Lycoming's prior expert witness. Lycoming's experts here concluded that the gouge was a strike mark without conducting any analysis of the mark, such as reviewing depth, contours, or paint transfer, meaning that the gouge could have been in existence prior to the crash or have been caused by a different plane part. Because the experts undertook no underlying analysis, a review of their conclusion is impossible, rendering their opinion unreliable.¹⁵³

Third, Sikkelee asserts that, while there is a mathematical formula to calculate preimpact engine RPM if there are at least two propeller ground strikes and if the distance between the propeller ground strikes can be accurately measured, the single NTSB photograph of the crash site does not establish two strike marks, nor does it permit any precise distance measurements that would permit an accurate calculation.

¹⁵² *Id.* at 7-10, 16-17.

¹⁵³ *Id.* at 10-11, 17-19.

Moreover, the experts do not know the type of camera, the lens used, or the distance or angle from which the photograph was taken, all of which render speculative any determination of the distance between the strike marks. Because precise measurements are required to perform an RPM calculation—even a mismeasurement of as little as one inch will alter the calculation—Sikkelee argues that the opinion is inherently unreliable.¹⁵⁴

Lycoming in turn asserts that its expert's calculation was performed in accordance with authoritative sources on the subject of determining RPMs through propeller damage—using techniques that have been adopted by the NTSB—and note that the propeller here exhibits at least eight of the thirteen damage signatures that are indicative of high power and high RPM impacts.¹⁵⁵

As to whether there were two propeller strike marks on the ground, Lycoming contends that, not only did the crash site examiners not conclusively determine that there was only one strike mark, but the photograph demonstrates two gouges and “[t]he propeller blade that struck first, Blade no. 1, hit the pavement with such force it broke off the outer 17 to 18 inches of the propeller. The other half of the propeller, Blade 2, shows unmistakable evidence of ground contact that can only be explained by a second blade strike.”¹⁵⁶

¹⁵⁴ *Id.* at 11-12, 19-21.

¹⁵⁵ Doc. 625 at 14-17.

¹⁵⁶ *Id.* at 17-18.

Finally, Lycoming asserts that Doud was able to measure the distance between the strike marks using photo scaling, which he was able to do because he knew the size of a piece of paper in the photograph. To the extent that Sikkelee believes that Doud speculates as to the size of the paper in the photograph, Lycoming asserts that this is a factual issue reserved for the jury—because Doud based his calculation on a reliable methodology, his opinion should be submitted to the jury.¹⁵⁷

After reviewing the evidence, the Court finds Sikkelee's arguments unpersuasive. First, with respect to her argument that the experts' RPM calculation based on propeller damage is fatally flawed, the Court disagrees. Doud relied on numerous characteristics that he determined were indicative of high engine power, including: chordwise/rotational scoring on the camber and face sides of the blade; numerous blade strikes, blade twisting and fracturing, s-bending, forward bending, rearward bending, portions of the blade having been torn off; an absence of torsional/spiral scoring on the spinner dome surface; and material deformation of the propeller extension/spacer opposite of the propeller blade rotation.¹⁵⁸

Many of these indicators of high engine power are discussed in the McCreary white paper, upon which Doud often relies in conducting his investigations.¹⁵⁹ Doud testified at the *Daubert* hearing that the indicators discussed in the McCreary white paper are authoritative, he frequently relies on those indicators and teaches them in

¹⁵⁷ *Id.* at 18-20.

¹⁵⁸ Doc. 613-4 at 8-19.

¹⁵⁹ Doc. 625-3 at 4-5; Doc. 625-5 at 8-9.

the propeller systems and accident investigation segment of the accident investigation course that he teaches for the Transportation Safety Institute, and that these indicators are accepted and used by the NTSB in its accident investigations. This is all strong evidence that the indicators upon which Doud relied are appropriate, and his opinion in that respect is reliable.

Although Sikkelee contends that Doud's methods and conclusions are contrary to the information contained in Wood and Sweginnis' authoritative book, *Aircraft Accident Investigation*, which explains that propeller damage cannot demonstrate engine RPM, that text has not been updated for more than fourteen years¹⁶⁰ and Doud opined at the *Daubert* hearing that, not only is the text outdated, but data that has been made available in the intervening years conclusively demonstrates that Wood and Sweginnis were incorrect in their assertions. Doud thus adequately explained why he discounted *Aircraft Accident Investigation* and instead relied on a different authoritative text.

As there is a sufficient basis for Doud's opinion, Sikkelee's arguments go to the weight that should be afforded to Doud's opinion, rather than the opinion's admissibility. This is a situation where competing texts offer competing views of how and whether propeller damage may be used to determine engine power and

¹⁶⁰ Doc. 625-3 at 5.

RPM; this is a dispute that must be resolved by a jury at trial, rather than by this Court prior thereto.¹⁶¹

As to the opinion that there were propeller strike marks on the ground, Sikkelee relies solely on the fact that the NTSB and several other investigative bodies that investigated the crash at the time determined that there was a single propeller strike mark.¹⁶² Regardless of whether other investigators concluded that there was only one strike mark, two of Lycoming's expert have determined based upon review of accident scene photographs that there were two propeller strike marks on the ground, and the photograph does reveal two distinct gouge marks—of similar appearance—that are located near each other.¹⁶³ Moreover, Doud explained that he reached his conclusion that there were two propeller strike marks “with a high degree of scientific certainty” based upon two facts.¹⁶⁴ First, he opined that “the photographic evidence is beyond dispute,” as it “depicts two parallel slices oriented perpendicular to the direction of impact. The strike marks match in size and orientation with the propeller blades.”¹⁶⁵ Second, as Doud confirmed during the

¹⁶¹ See *United States v. 14.38 Acres of Land, More or Less Situated in Leflore Cty., State of Miss.*, 80 F.3d 1074, 1077 (5th Cir. 1996) (“As a general rule, questions relating to the bases and sources of an expert’s opinion affect the weight to be assigned that opinion rather than its admissibility and should be left for the jury’s consideration” (internal quotation marks omitted)).

¹⁶² Doc. 613 at 10-11.

¹⁶³ See Doc. 625 at 6.

¹⁶⁴ Doc. 625-3 at 6.

¹⁶⁵ *Id.*; see also Doc. 613-4 at 22-25.

Daubert hearing, “the damage to the tip of Blade 2, which is the non-fractured blade, could not have occurred other than as a result of a [second propeller] blade strike.”¹⁶⁶

Given that there is substantial evidence to support Doud’s conclusion that there are two strike marks, the Court concludes that Sikkelee’s arguments go to the weight that should be afforded to Doud’s opinion, rather than its admissibility. Again, while Doud may ultimately be incorrect, this is a matter that must be left for a jury to evaluate.

Finally, with respect to Sikkelee’s challenge to the engine RPM calculation based on the propeller strike marks, Sikkelee asserts that it is impossible to accurately determine the distance between the alleged strike marks, given the lack of any reliable distance indicators in the photo upon which Doud relies.¹⁶⁷ She further argues that, because Doud did not account for potential lens distortions, his calculation cannot be considered reliable.¹⁶⁸

The Court finds both arguments weighty, but ultimately unpersuasive. As to Doud’s measurements, he testified at the *Daubert* hearing that he was able to determine upon visual inspection that, in the picture of the crash scene, there was an 8 ½ by 11-inch piece of paper in the photograph that had been folded in half.¹⁶⁹

¹⁶⁶ Doc. 625-3 at 6.

¹⁶⁷ Doc. 613 at 11-15, 19-21.

¹⁶⁸ *Id.*

¹⁶⁹ As Doud discussed at the *Daubert* hearing, his determination of the size of the paper is supported by his comparison of that paper to the hat contained in the photograph. *See also* Doc. 613-4 at 26 (noting that Doud’s determination that paper was folded paper was reasonable “based on size of hat in photo”).

Using that measurement as a baseline, Doud was able to calculate the distance between the two strike marks in that photograph.¹⁷⁰ Although Sikkelee may attempt to undercut that conclusion at trial, at the moment there is no evidence in the record that undermines Doud’s conclusion. The Court is mindful that “‘questions regarding the factual underpinnings of the expert witness’ opinion affect the weight and credibility’ of the witness’ assessment, ‘not its admissibility.’”¹⁷¹ Given that there is some basis to support Doud’s measurements, his reliance on the piece of paper in the photograph to conduct those measurements does not render his opinion inadmissible.

Similarly, although Sikkelee argues that Doud’s RPM calculation is fatally flawed because he did not account for lens distortion when determining the distance between the propeller strikes, the Court again concludes that this issue goes to weight, rather than admissibility. Doud scaled the photo¹⁷² using a technique that “is widely used by accident investigators and is recognized as mathematically sound and reliable.”¹⁷³ Although, at the *Daubert* hearing, counsel for Sikkelee presented a great deal of information that suggests lens and angle distortion is a real phenomenon that can have a significant impact on distance measurements in a photograph, Doud

¹⁷⁰ Using those measurements, Doud was able to calculate the airplane’s RPM at the moment of impact with the ground using a well-established mathematical equation—an equation that Sikkelee does not challenge. (*Id.* at 26-27).

¹⁷¹ *Bresler v. Wilmington Tr. Co.*, 855 F.3d 178, 195 (4th Cir. 2017) (quoting *Structural Polymer Grp. v. Zoltek Corp.*, 543 F.3d 987, 997 (8th Cir. 2008) (brackets omitted)).

¹⁷² Doc. 613-4 at 26.

¹⁷³ Doc. 625-3 at 8.

testified at the *Daubert* hearing that, in his opinion, such distortions would not impact his measurements. There is no evidence that such distortion would have any appreciable impact on Doud's measurements in that particular photograph and, thus, no direct evidence that contradicts Doud's conclusion that such distortions need not be accounted for in conducting measurements between objects within that photograph.

This is not to say that Doud emerged entirely unscathed from the *Daubert* hearing. Counsel for Sikkelee did some damage to Doud's calculation by calling into question the accuracy of his measurements. However, As the United States Court of Appeals for the Eighth Circuit has explained:

As a general rule, the factual basis of an expert opinion goes to the credibility of the testimony, not the admissibility, and it is up to the opposing party to examine the factual basis for the opinion in cross-examination. Only if the expert's opinion is so fundamentally unsupported that it can offer no assistance to the jury must such testimony be excluded.¹⁷⁴

Because there is no evidence that distortion would have a significant enough impact to materially alter Doud's measurement and, thus, his calculation, the potential existence of distortions in the photograph does not render Doud's measurements and calculation "so fundamentally unsupported that [they] can offer no assistance to the jury."¹⁷⁵ These issues therefore go to weight, not admissibility,

¹⁷⁴ *First Union Nat. Bank v. Benham*, 423 F.3d 855, 862 (8th Cir. 2005).

¹⁷⁵ *Id.*

and Sikkelee's motion to strike the propeller damage and RPM analyses will be denied.

iv. Sikkelee's Motion to Strike W. Jeffrey Edwards' Testimony

Sikkelee next seeks to exclude the expert opinion of W. Jeffrey Edwards, who opines that, based upon certain risk factors that David Sikkelee presented and the testimony of witnesses to the crash, Mr. Sikkelee likely induced an aerodynamic stall that caused the plane crash.¹⁷⁶ Sikkelee contends that Edwards provides no evidence to support his assertion that Mr. Sikkelee made any errors or actually presented any risk factors that could reasonably have contributed to the crash. First, Sikkelee asserts that Edwards' opinion about human errors is unreliable, as it is a system to classify pilot errors and provide possible causes for a crash, but cannot aid a jury in determining whether a crash was actually caused by human error.¹⁷⁷

Second, Sikkelee contends that Edwards' opinion regarding an absence of power loss in the engine and whether pilot error caused the crash is unreliable because he ignores eyewitness testimony that confirms the airplane's engine "was sputtering," which supports the notion that engine failure caused the aerodynamic stall and subsequent crash. In any event, the witness' testimony cannot establish that the stall was caused by pilot error, rather than engine failure.¹⁷⁸ Finally, Sikkelee argues that Edwards' opinion in some ways does not fit the case, as his assertion that

¹⁷⁶ Doc. 615.

¹⁷⁷ *Id.* at 10-13.

¹⁷⁸ *Id.* at 13-14.

a missing shoulder harness caused injuries to the passenger is irrelevant and intended only to convince the jury that the decedent was a negligent pilot, and his discussion of mountain flying is irrelevant since the plane did not crash near mountains.¹⁷⁹

With the exception of one portion of Edwards' opinion, while this presents a close question, the Court concludes that Edwards' opinions are admissible. Although Edwards considered risk factors that were present when David Sikkelee crashed,¹⁸⁰ Edwards testified at the *Daubert* hearing that such information is important in determining the cause of a crash and, specifically, helps frame the accident. In reaching his opinion that pilot error likely caused the crash, Edwards relied upon certain risk factors but, also, the absence of evidence indicating a mechanical malfunction, accident reconstruction data, wreckage inspections, airport geography and dimensions, and eyewitness testimony.¹⁸¹

While certain risk factors cannot alone support Edwards' conclusion, such information is still helpful in determining whether pilot error was more likely than not the cause of the crash. For example, Edwards discusses how pilot inexperience and decisional errors are significant contributing factors to many aircraft accidents, and relates that to David Sikkelee by way of his inexperience flying in mountainous terrain.¹⁸² Mr. Sikkelee's inexperience may have led him to misperceive the risk

¹⁷⁹ *Id.* at 14-15.

¹⁸⁰ Doc. 615-1 at 47-57.

¹⁸¹ *See* Doc. 615-1.

¹⁸² *Id.* at 51-53.

associated with the takeoff on the day of the crash, which was extremely difficult.¹⁸³

As Edwards testified during the *Daubert* hearing, due to the mountainous terrain near the airport from which Mr. Sikkelee took off, were a pilot to attempt to fly straight from the runway to clear the mountains, he would stall the aircraft; to properly and safely take off, a pilot must instead turn from the mountains while gaining altitude.

In addition to relying on risk factors, Edwards supports his opinion with evidence that indicates Mr. Sikkelee did not obtain sufficient speed before takeoff, which led to an aerodynamic stall and the subsequent crash. This evidence includes two witnesses who stated that the aircraft was not moving fast enough for takeoff as it moved down the runway, two witnesses who denied hearing any unusual noise emanating from the aircraft as it moved down the runway, and a witness' statement that the aircraft was in a steep, nose down left turn with the left wing perpendicular to the ground just before the plane impacted the ground.¹⁸⁴ This information supported, in Edwards' opinion, the notion that pilot error caused the crash. Because Edwards considered a great deal of information when he concluded that pilot error likely caused the crash, his consideration of risk factors does not, alone, render his opinion inadmissible.

¹⁸³ *Id.*

¹⁸⁴ Doc. 615-1 at 7-8, 77, 85-86.

With respect to Sikkelee's argument that Edwards' opinion is unreliable because he failed to consider a witness statement from Emagene Maar that contradicted her earlier statement—the statement upon which Edwards relied—and which contradicts his conclusions, the Court finds that Maar's witness statement does not fatally undermine Edwards' opinion.

First, Edwards apparently discounted Maar's statement that the engine was sputtering because that statement was made years after the accident and was inconsistent with her statement at the time of the accident, wherein she stated only that the aircraft engine sounded like it was operating at a low RPM.¹⁸⁵ That earlier statement is consistent with two other witnesses who stated that they did not hear any unusual noises emanating from the engine during takeoff.¹⁸⁶ Of course, Maar later stated that the engine sounded as though it was sputtering and “was just not going to make it.”¹⁸⁷ While this is contradictory information, it does not render Edwards' opinion inadmissible, as “questions regarding the factual underpinnings of the expert witness' opinion affect the weight and credibility of the witness' assessment, not its admissibility.”¹⁸⁸ Moreover, Edwards did not rely solely on

¹⁸⁵ Doc. 626 at 18.

¹⁸⁶ Doc. 615-1 at 8.

¹⁸⁷ Doc. 615-3 at 3; *see* Doc 626-3 at 3.

¹⁸⁸ *Bresler*, 855 F.3d at 195 (brackets and internal quotation marks omitted). Similarly, at the *Daubert* hearing Edwards confirmed that, while witnesses confirmed that the aircraft was moving slowly down the runway, it was technically still possible for Mr. Sikkelee to safety takeoff. This information likewise goes to the weight that may be afforded to Edwards' opinion, rather than its admissibility.

witness statements, but also considered other factors to help rule out a mechanical failure, such as a review of maintenance records and analysis of the aircraft wreckage, including the propeller and ground strikes.¹⁸⁹ This information collectively forms a sufficient foundation for Edwards' opinion, such that a single, contradictory witness statement does not render that opinion inadmissible.

Finally, Sikkelee argues that Edwards' opinion in some ways does not fit the case, as Edwards' assertion that a missing shoulder harness caused injuries to the passenger is irrelevant and intended only to convince the jury that the decedent was a negligent pilot, and his discussion of mountain flying is irrelevant since the plane did not crash near the mountains.¹⁹⁰ As to Edwards' discussion of mountain flying, as he explained in his expert opinion, mountain flying was relevant to the crash because flying in mountainous areas is extremely risky, particularly for novice pilots.¹⁹¹ Edwards further explained during the *Daubert* hearing that the mountainous terrain near the airport from which Mr. Sikkelee took off forces pilots to maneuver immediately upon takeoff, since attempting to fly straight after takeoff would induce an aerodynamic stall due to the rapid rise in elevation from the mountainous terrain. Edwards thus adequately relates the mountainous terrain to the crash, and his opinion fits this case.

¹⁸⁹ Doc. 615-1.

¹⁹⁰ Doc. 615 at 15.

¹⁹¹ Doc. 615-1 at 52-53.

However, the Court finds that Edwards' discussion of an allegedly missing shoulder harness, and the consequences of that missing shoulder harness, are inadmissible. First, there does not appear to be a link between the allegedly missing shoulder harness and the crash other than, perhaps, to intimate that because Mr. Sikkelee was negligent in failing to recognize the missing shoulder harness, he was also negligent in the takeoff procedures; such inferences are simply not permissible.¹⁹² Second, to the extent that Edwards opines that "[t]he facial/ head injuries [to Mr. Sikkelee's passenger] are consistent with [the passenger] impacting the interior of the aircraft as a result of not wearing a shoulder harness,"¹⁹³ there is absolutely no indication in the record that Edwards has any reasonable basis to reach such a conclusion, or that he is qualified to offer such an opinion. As a result, the Court will exclude any testimony from Edwards related to the allegedly missing shoulder harness and injuries that purportedly arose as a result of the missing shoulder harness.

v. Lycoming's Motion to Strike Michael Schiefer's Opinion

Turning to Lycoming's motions, Lycoming first seeks to exclude Michael Schiefer's expert opinion on several grounds. Schiefer opines that Lycoming was required to report alleged issues with loose carburetor body-to-bowl screws pursuant to 14 C.F.R. § 21.3, and concludes that, had Lycoming issued such reports, the FAA

¹⁹² The Court notes that Lycoming has not defended this portion of Edwards' opinion in its response brief and, thus, provides no explanation for the potential relevance of this opinion.

¹⁹³ *Id.* at 21.

would more likely than not have issued an appropriate airworthiness directive under 14 C.F.R. § 39.¹⁹⁴ He further opines that Lycoming was required to file such a report even if the FAA was previously notified of the issue by way of an FAA Service Difficulty Report (SDR), as the FAA does not always monitor the SDR database for defect trends.¹⁹⁵ He then concludes that the use of safety wire, rather than lock tab washers, to hold the carburetor screws in place would have prevented the crash, and that the FAA would have approved safety wire had Lycoming filed a 21.3 Report or initiated the change itself.¹⁹⁶

First, Lycoming asserts that its responsibilities or potential liability under 14 C.F.R. § 21.3 is not at issue in this case because Lycoming previously obtained summary judgment on Sikkelee's failure-to-warn claim, which was premised on an alleged failure to comply with 14 C.F.R. § 21.3. Lycoming argues that any failure to comply with § 21.3 is therefore simply not relevant to the remaining issues in this case—issues of manufacturer liability and causation, as well as whether a change to the product was substantial and whether that change was reasonably foreseeable to Lycoming. Thus, Lycoming asserts that Schiefer's opinion does not fit the case.¹⁹⁷

Second, Lycoming contends that many of Schiefer's opinions are thinly-veiled legal conclusions that may not be presented to the jury, as they usurp the

¹⁹⁴ Doc. 617-1 at 7-8.

¹⁹⁵ *Id.*

¹⁹⁶ *Id.* at 11-12.

¹⁹⁷ Doc. 617 at 15-16.

judge's role of instructing the jury on the law, and the jury's role of applying the facts to that law. For example, Schiefer opined that: Lycoming failed to submit required reports to the FAA of failure, malfunctions, and defects in the MA-4SPA model carburetor in violation of 14 C.F.R. § 21.3; if Lycoming had issued § 21.3 reports, the FAA likely would have issued an appropriate airworthiness directive under 14 C.F.R. § 39; Lycoming has the final responsibility to ensure that MA-4SPA carburetors conform to the FAA approved type design of Lycoming's O-320 series engines; and Lycoming is responsible for the design of all MA-4SPA carburetors, including carburetor component parts manufactured by third parties under FAA PMA approval.¹⁹⁸

Third, Lycoming argues that Schiefer opinions are unreliable because they are based solely on speculation with no factual support. Thus, Schiefer asserts that Lycoming was required to notify the FAA of issues with the carburetors, despite the fact that (1) there is no legal authority to support this assertion, (2) there are several exceptions to the reporting requirement, and (3) the FAA already had all the relevant information. Similarly, Lycoming argues, Schiefer does not cite to any authority that supports his assertion that a report in the FAA's SDR system puts a manufacturer on notice of a defect or issue with its product. Schiefer also fails to support with any

¹⁹⁸ *Id.* at 16-19.

legal citation his assertion that Lycoming is legally responsible for carburetor overhaul components manufactured by third parties under FAA PMA approval.¹⁹⁹

Finally, Lycoming argues that Schiefer has no reliable basis for his assertions regarding the efficacy of safety wire and the cause of the accident. Despite having no experience in engineering nor having conducted any analysis of the carburetor, Schiefer opines that safety wire is superior to lock washers, and lock washers should never have been used on the carburetor. He offers no analysis of what caused the accident but, instead, merely adopts another expert's opinion and, while he opines that safety wire is effective, he offers no evidence that lock washers are any less effective.²⁰⁰

As to Lycoming's first argument, the Court agrees that Lycoming's alleged failure to comply with 14 C.F.R. § 21.3 is no longer relevant, given that judgment has been entered on Lycoming's behalf for Sikkelee's failure-to-warn claim—a claim that was premised on Lycoming's alleged failure to comply with 14 C.F.R. § 21.3.²⁰¹ Even though, as Sikkelee notes, Lycoming raised as an affirmative defense that the FAA had issued a Type Certificate for the carburetor at issue here,²⁰²

¹⁹⁹ *Id.* at 19-22.

²⁰⁰ *Id.* at 22-24.

²⁰¹ Although Sikkelee contends that Schiefer's opinion is necessary to elaborate upon "the standard of care for an aviation manufacturer who has received objective evidence of a design defect in its certificated product," (Doc. 621-1 at 12-13), such information is not relevant, as the Third Circuit previously held that Sikkelee cannot "use a federal duty and standard of care as the basis for [her] state-law negligence claim." *Sikkelee*, 907 F.3d at 717.

²⁰² See Doc. 206 at 39-40.

Schiefer's opinion goes far beyond merely explaining the certification process and FAA regulations at issue. Rather, Schiefer opines that Lycoming was legally obligated to report carburetor issues under 14 C.F.R. § 21.3, details what that section requires and why Lycoming was required to report under the regulations, and then concludes that, had Lycoming issued the required report, the FAA would likely have issued an airworthiness directive under 14 CFR § 39.²⁰³ This goes beyond simply detailing the regulations and explaining why FAA certification does not mean that a product is safe in order to rebut any inference or argument to the contrary from Lycoming but, instead, reaches an impermissible legal conclusion about the applicability of certain regulations²⁰⁴ and Lycoming's legal requirements under those regulations.²⁰⁵

In addition to delving into improper legal conclusions, Schiefer's opinion regarding Lycoming's purported legal obligation to submit reports to the FAA is overly speculative. As Schiefer himself notes in his expert report, companies do not need to submit reports pursuant to 14 C.F.R. § 21.3 if any failures were the result of,

²⁰³ Doc. 617-1 at 7-9.

²⁰⁴ Similarly, as to Sikkelee's contention that Schiefer's opinion is necessary to "debunk the Defendant's assertion that FAA certification is an implicit declaration that a design is free of defect" and that "that the overhaul of the subject carburetor somehow severs all responsibility," (Doc. 621-1 at 12-13, *see id.* at 11-13), his opinion goes beyond what is necessary to establish those points, insofar as he offers opinions regarding Lycoming's legal duties under certain regulations.

²⁰⁵ *See Berckelely Inv. Grp., Ltd. v. Colkitt*, 455 F.3d 195, 218 (3d Cir. 2006) (permitting expert testimony that detailed "[t]he customs and business practices in the securities industry," but not permitting testimony "as to whether Berckelely complied with legal duties that arose under the federal securities laws").

inter alia, improper maintenance or use.²⁰⁶ There is no indication in Schiefer's report whether he concluded that any issues with the carburetors were not attributable to improper maintenance or use and, if so, how he so concluded. With no basis to eliminate improper maintenance or use as a cause of the carburetor issues, his opinion that Lycoming was required to report carburetor issues to the FAA is far too speculative to be admitted.²⁰⁷

Finally, Lycoming argues that Schiefer has no reliable basis for his assertions regarding the efficacy of safety wire and the cause of the accident. Despite having no experience in engineering nor having conducted any analysis of the carburetor, Schiefer opines that safety wire is superior to lock washers, and lock washers should never have been used on the carburetor. Lycoming asserts that, while Schiefer opines that safety wire is effective, he offers no evidence that lock washers are any less effective.²⁰⁸

The Court finds this argument unpersuasive, as it goes to weight, rather than to admissibility. Schiefer asserts that he has 43 years of experience in the aviation field and has never witnessed a bolt secured with safety wire come loose, and notes that the FAA considers safety wire to be the most effective method of preventing a bolt from coming loose.²⁰⁹ This provides at least some basis for Schiefer's opinion

²⁰⁶ Doc. 617-1 at 5.

²⁰⁷ This reasoning applies with equal force to Schiefer's opinion that Lycoming controls the design of the carburetors and, therefore, is responsible for reporting any issues to the FAA.

²⁰⁸ Doc. 617 at 22-24.

²⁰⁹ Doc. 617-1 at 11-13.

that safety wire is preferable to lock tab washers, even if he may ultimately be incorrect, and even if lock tab washer may be a perfectly safe and effective method of preventing screws from loosening.

Accordingly, Lycoming's motion will be granted in part, such that Schiefer is prohibited from testifying as to Lycoming's legal duties under the regulatory framework discussed in his expert report.²¹⁰ The motion will be denied in all other respects.

vi. Lycoming's Motion to Strike Donald E. Sommer's Opinion

Finally, Lycoming seeks to exclude Donald E. Sommer's expert opinion for three reasons.²¹¹ First, Lycoming asserts that Sommer offers no evidence that, even if the carburetor screws were loose, they were loose enough that the engine would have failed to obtain full power since Sommer's own testing demonstrates that loose carburetor screws will only impact engine power when all screws are loosened by at least six flats. However, here Sommer conducted no testing that would permit him to conclude that the carburetor screws were loosened by at least six flats. Moreover, such an assertion is contrary to an NTSB photograph of the carburetor taken post-crash, which shows two of the lock tab washers in their full clockwise orientation at the time of impact. Lycoming contends that the absence of any evidence that would

²¹⁰ Although Lycoming also challenges Schiefer's conclusion that a report in the FAA's SDR system puts a manufacturer on notice of a defect or issue with its product, in this case it is clear that Lycoming was actually informed of reports in the FAA's SDR system, rendering this point moot. (Doc. 617-1 at 7).

²¹¹ Doc. 619.

demonstrate that the screws were loosened by at least six flats fatally undermines Sommer's opinion.²¹²

Second, Lycoming argues that Sommer's own testing demonstrates that if carburetor screws are loosened by four flats, the engine will not start,²¹³ and the engine will not fail until the carburetor screws are loosened by at least six flats. Thus, if the carburetor screws were loose enough prior to the accident to have impacted the airplane engine's power, the engine would not have started. Lycoming asserts that this fatally undermines Sommer's opinion, as testimony establishes that the engine started with no issues on the day of the accident.²¹⁴

Lastly, Lycoming contends that Sommer's opinion is unreliable because he failed to consider, let alone rule out, the post-impact fire as the cause of any loose carburetor screws—this demonstrates that Sommer failed to undertake a proper differential diagnosis. Rather than use a reliable methodology to exclude fire as the cause of the loose screws, in Lycoming's view, Sommer simply excluded fire "by insinuation," despite evidence that fire caused damage to the carburetor and burned away the gaskets against which the carburetor screws were tightened.²¹⁵

²¹² *Id.* at 20-24.

²¹³ During testing, when the carburetor screws were loosened four flats, Sommer had his assistant use wire and physical force to press the two halves of the carburetor together to start the engine, and then release the carburetor halves after the engine started. This effectively retightened the screws while the engine was started.

²¹⁴ *Id.* at 24-26.

²¹⁵ *Id.* at 26-28.

As to Lycoming's first argument, there is some evidence to support the notion that the carburetor screws were loosened six flats at the time of the crash. Richard McSwain²¹⁶ analyzed the carburetor and conducted testing on an exemplar carburetor to determine that the carburetor bowl and throttle body were loose, relying on evidence including that: there was lead on all sides of the carburetor, which indicated an in-flight fuel leak resulting from loose carburetor halves, rather than a fuel leak that started after the crash, which would have resulted in lead on only portions of the engine; fastener hole damage in the carburetor was similar to damage that resulted from shaker tests of a carburetor with a loose bowl, indicating that the carburetor bowl and throttle body were loose prior to the crash;²¹⁷ thread impression marks in unthreaded portions of the fastener holes were created by dropping weight on the exemplar carburetor, but the resulting thread marks were different from thread marks in the actual carburetor, demonstrating that the thread marks were not caused by the crash;²¹⁸ and smooth thread contact grooves were worn into the fastener hole walls, which was "indicative of fastener looseness and fastener-induced thread contact wear."²¹⁹

While this collectively indicated that the carburetor screws were loose prior to the crash, McSwain also examined the throttle body fastener holes which showed

²¹⁶ Sommer's expert opinion relies to a great extent on testing conducted by McSwain and, accordingly, those opinions are discussed together in this section.

²¹⁷ Doc. 622-12 at 17. *See also* McSwain's *Daubert* testimony.

²¹⁸ *Id.* at 16-17.

²¹⁹ *Id.* at 27.

shearing within those holes, which indicated that the carburetor screws were loose and were rubbing up and down inside the holes.²²⁰ As McSwain testified to at the *Daubert* hearing, the throttle body fasteners were sheared to a depth of six threads, while a fully-engaged screw would penetrate seven threads deep.²²¹ This allowed McSwain to conclude that the threads were approximately six flats—or one full screw turn—loose prior to the crash, which is the approximate looseness required before the engine would fail. Thus, there is some basis for McSwain to conclude that the carburetor screws were sufficiently loose to cause engine failure.²²² That Lycoming has produced photos that may show the lock tab washers were fully engaged does not negate the basis for McSwain’s conclusion, but merely creates a factual issue that a jury must resolve.

With respect to Lycoming’s second argument, Sommer and McSwain have adequately explained how the engine could have started on the day of the crash, but then failed after takeoff. As McSwain explained in his most recent report, vibrational testing revealed that “vibration-induced loosening is rapid, and the throttle body-to-bowl fastener rotated from finger tight to three head flats loose in approximately one second. The fastener also rotated from three head flats loose to six head flats loose

²²⁰ *Id.* at 11-12.

²²¹ *See also* Doc. 622-14 at 3.

²²² To the extent that Lycoming contends Sommer failed to disclose that the engine would not start when the carburetor screws were loosened by four or more flats, the Court disagrees. The video of Sommer’s testing clearly demonstrates that the engine would not start without some form of force to hold the carburetor bowl and throttle body together.

in approximately one second.”²²³ This testing demonstrates that it is possible that the carburetor screws were initially three flats loose and, thus, the engine was able to start, but that vibration that occurred during takeoff loosened the screws an additional three flats, meaning that the carburetor screw would be sufficiently loose that the airplane engine would fail. The Court therefore finds Lycoming’s argument to be without merit.

Finally, Lycoming’s contention that Sommer failed to consider, let alone rule out, the post-impact fire as the cause of any loose carburetor screws is likewise unpersuasive. McSwain testified at the *Daubert* hearing that lead was found around the entire carburetor, which indicates that carburetor was loose and leaking fuel prior to the crash since, had the carburetor looseness occurred post-crash, fuel would be found on only portions of the carburetor, as gravity would pull the fuel in one direction. Moreover, in McSwain’s rebuttal report he states that:

Laboratory examination of the carburetor revealed clear evidence of oscillatory motion and wear between the throttle body fasteners and that fastener hold walls and between the lock-tab washers and the contracted throttle body surfaces, both indicative of pre-impact looseness. Based on the laboratory findings, the hypothesis that the post-impact looseness condition observed in the subject carburetor [was] caused by the post-impact fire was rejected.²²⁴

It is thus clear from the record that Sommer and McSwain did consider and exclude the post-crash fire as the cause of the looseness observed in the carburetor. Because

²²³ *Id.* at 3-4.

²²⁴ Doc. 622-13 at 1-2.

Sommer's opinion finds sufficient support in the factual record and because he considered all relevant information when reaching his opinion, there is no basis upon which to exclude the opinion, and Lycoming's motion will be denied.

III. CONCLUSION

In accordance with the above discussion, the motions to strike will largely be denied, although the Court will disallow portions of Edwards' and Schiefer's opinions, consistent with the foregoing discussion.

An appropriate Order follows.

BY THE COURT:

s/ Matthew W. Brann

Matthew W. Brann

United States District Judge